2.12 CONSTRUCTION SCHEDULE AND OPERATION ACTIVITIES

WAC 463-42-235 Proposal – Construction and operation activities. *The applicant shall: Provide the proposed construction schedule, identify the major milestones, and describe activity levels versus time in terms of craft and noncraft employment; and describe the proposed operational employment levels.*

2.12.1 Introduction

The construction of the Kittitas Valley Wind Power Project will be performed in several stages and will include the following main elements and activities:

- Grading of the field construction office area (also used for O&M building);
- Construction of site roads, turn-around areas and crane pads at each wind turbine location;
- Construction of the turbine tower foundations and transformer pads;
- Installation of the electrical collection system – underground and some overhead lines;
- Assembly and erection of the wind turbines;
- Construction and installation of the substation;
- Plant commissioning and energization.

The Applicant intends to enter into two primary agreements for the construction of the Project: including an agreement for the supply, erection and commissioning of the wind turbines as well as an Engineering, Procurement and Construction (EPC) contract for the construction of the balance of plant (BOP) which includes all other Project facilities and infrastructure such as the roads, electrical collection system, substation, O&M Facility, etc. The turbine supplier and the EPC Contractor will be selected during the EFSEC Application review process.

The construction schedules discussed below are based on obtaining a site certificate from Washington EFSEC by October 1, 2003.

The construction schedule will closely follow the construction methodologies discussed in Section 2.14, 'Construction Methodology'.

2.12.2 Proposed Construction Schedule, Activities and Milestones

This section describes the engineering, procurement, construction, and start-up schedule milestones for the Project. For wind power projects, the longest lead-time items are typically the substation transformers, usually requiring from 8-12 months from time of order to delivery and the wind turbines, generally requiring from 5 to 7 months. These long lead time items will be ordered as soon as possible immediately following obtaining site certification from EFSEC.

The proposed Project construction schedule summary showing the major tasks and key milestones is included below in Table 2.12.2-1. Also shown in Table 2.12.2-1 is the number of expected on-site personnel to perform each of the key tasks. It is expected that Project construction will occur over a period of approximately 1 year from the time of site certification to commercial operation and will require the involvement of more than 250 personnel.

Table 2.12.2-1 Proposed Project Construction Schedule Summary				
	TASK / MILESTONE	***START***	***FINISH***	***Approx. On-Site Manpower for Task***
1	Obtain EFSEC Site Certification	*TARGET*	10/1/03	
2	Engineering/Design/Specifications/Surveys	8/6/03	9/30/03	18
3	Order/Fabricate Wind Turbines	10/1/03	3/16/04	0
4	Order/Fabricate Substation Transformer	10/1/03	6/1/04	0
5	Road Construction	10/1/03	1/20/04	30
6	Foundations Construction	10/22/03	4/6/04	60
7	Electrical Collection System Construction	11/19/03	5/4/04	40
8	Substation Construction	1/14/04	6/1/04	20
9	Wind Turbine Assembly and Erection	3/17/04	9/21/04	40
10	Plant Energization and Commissioning	5/12/04	9/28/04	30
11	Plant Substantial Completion	*TARGET*	9/28/04	0
12	Construction Punchlist Clean-Up	8/25/04	11/16/04	15
			TOTAL	**253**

2.12.3 Construction Workforce and Employment Levels

The amount of craft and noncraft employment is outlined in Table 2.12.3-1 "Labor Force Mix". Overall, the Project anticipates the involvement of more than 250 on-site personnel.

Table 2.12.3-1 "Construction Labor Resource Loading" presents the estimated total workforce resource loading, by month, for the construction of the Project. At peak, it is expected that about 160 personnel will be on-site at once as multiple disciplines of contractors complete their work simultaneously. All employees are assumed to work single 10-hour shifts, 5 or 6 days per week, as the work demands, for the duration of Project construction. During turbine erection, both stand-by days and days with double shifts are anticipated to allow for turbine erection in low wind conditions.

A detailed discussion of where the construction workforce originates, where they will be housed and how they will travel to the Project site is included in Section 8.1 'Socioeconomic Impact'.

Table 2.12.3-1 Construction Labor Force Mix (Approximate # Personnel)					
Construction Phase	**Project Management &Engineers**	**Field Technical Staff**	**Skilled Labor & Equip Operators**	**Unskilled Labor**	**TOTAL**
Engineering/Surveying/Design	6	12	0	0	18
Road Construction	5	5	15	5	30
Foundations Construction	3	4	23	30	60
Electrical Collection System Construction	2	3	23	12	40
Substation Construction	5	3	8	4	20
Wind Turbine Assembly and Erection	4	6	15	15	40
Plant Energization and Commissioning	5	10	15	0	30
Construction Punchlist Clean-Up	1	1	3	10	15
TOTALS	**31**	**44**	**102**	**76**	**253**

Table 2.12.3-2 Construction Labor Resource Loading (Approximate # Personnel)					
Month Before Commercial Operation	**Project Management &Engineers**	**Field Technical Staff**	**Skilled Labor & Equipment Operators**	**Unskilled Labor**	**TOTAL**
14	6	0	0	0	**6**
13	6	12	0	0	**18**
12	5	5	15	5	**30**
11	8	9	38	35	**90**
10	10	12	61	47	**130**
9	10	12	61	47	**130**
8	10	10	54	46	**120**
7	10	10	54	46	**120**
6	14	16	69	61	**160**
5	14	19	38	19	**90**
4	9	16	30	15	**70**
3	9	16	30	15	**70**
2	9	16	30	15	**70**
1	5	10	15	0	**30**
0	5	10	15	0	**30**
CLEAN UP	1	1	3	10	**15**

2.12.4 Operations and Maintenance Labor Force

The Project will be operated and maintained by a team of approximately 16 to 18 personnel consisting of the following staff positions:

Position	Number of Personnel
Plant/Site Manager	1
Operations Manager	1
Operating Technicians	8-10
Administrative Manager	1
Administrative Assistant	1
TOTAL	16-18

The Operations and Maintenance (O&M) team will staff the Project during core operating hours 8 hours per day, 5 days per week, with weekend shifts and extended hours as required. The Project's central Supervisory Control and Data Acquisition (SCADA) system stays on-line full time, 24 hours per day, 365 days per year. In the event of turbine or plant facility outages, the SCADA system will send alarm messages to on-call technicians via pager or cell phone to notify them of the outage. The Project will always have a local, on-call local technician who can respond quickly in the event of any emergency notification or critical outage. Operating technicians will rotate the duty of being on-call for outages.